Deposition and characterization of SnSe and CuInSe2 thin films by thermal evaporation technique from synthesized SnSe and CuInSe2 sources

Abstract

Tin selenide (SnSe) and copper indium diselenide (CuInSe2) compounds were synthesized by high temperature reaction method using combination of sealed ampoule (at relatively low pressure ~10-1 Pa without inert gas) and heating at specific temperature profile in rocking furnace. Powder X-Ray diffraction analysis showed that the products involved only single phases of SnSe and of CuInSe2 only. Using the reaction products as source materials, the SnSe and CuInSe2 thin films were vacuum-deposited on glass substrates at room temperature. Structural, elemental, surface morphological and optical properties of the as-deposited films were studied by X-Ray diffraction (XRD), energy dispersive X-Ray (EDX) analysis, field emission scanning electron microscopy (FESEM) and UV-Vis-NIR spectroscopy. Single phase of SnSe and CuInSe2 films were obtained by thermal evaporation technique from synthesized SnSe and CuInSe2 compound without further treatment.

Keyword: CuInSe; SnSe; Solid state reaction; Source material; Thin films